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Children and adolescents with autism spectrum disorders compared to typically developing controls on the Behavioral Assessment System for Children, Second Edition (BASC-2)

Sara Mahan, Johnny L. Matson *

Louisiana State University, United States

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ABSTRACT

As the *Behavioral Assessment System for Children, Second Edition* (*BASC-2*) is often used to aid in diagnosis it is important to discern how children and adolescents with Autism Spectrum Disorder (ASD) score on the *BASC-2* compared to typically developing controls. This study compared scores of typically developing children and adolescents to those diagnosed with ASD on all subscales and composites of the *BASC-2*. Except for the aggression subscale, anxiety subscale, and the internalizing composite, the ASD group scored significantly higher on all clinical subscales and composites (i.e., hyperactivity, conduct problems, externalizing composite, depression, atypicality, withdrawal, attention problems, and the Behavioral Symptoms Index). However, the ASD group scored significantly lower on the adaptability composite and all subscales comprising this composite.

Children and adolescents with Autism Spectrum Disorder (ASD) present with a variety of adaptive concerns (Perry, Flanagan, Geier, & Freeman, 2009; Schreibman, 2005), challenging behaviors (Gurney, McPheeters, & Davis, 2006, as cited in Knoll, 2008; Matson, Wilkins, & Macken, 2009; Mudford et al., 2008; Nicholas et al., 2008), and symptoms of comorbid psychopathology (Kim, Szatmari, Bryson, Streiner, & Wilson, 2000; Leyfer et al., 2006; MacNeil, Lopes, & Minnes, 2009). Thus, it is important to assess for these as part of a comprehensive evaluation. *The Behavioral Assessment Scale for Children, Second Addition* (*BASC-2*; Reynolds & Kamphaus, 2004) is one commonly used broad band measure to assess for all of these concerns among a variety of populations, including children and adolescents with ASD.

The use of broad band measures is common, partly because of their ability to assess for a variety of concerns using one measure. As such, it is useful to identify whether children and adolescents with ASD score differently on this measure compared to other populations. Although there have been some studies utilizing the *BASC-2* to analyze differences in subscales and composites between individuals with different ASD diagnoses (Flom, 2007; Valencia, 2006), only one has compared differences in scores of children and adolescents with ASD to typically developing children and adolescents (Knoll, 2008). The study by Knoll (2008) consisted of 187 children, 6–16 years of age, with high functioning autism (HFA; $n = 79$), low functioning autism (LFA; $n = 42$), and typically developing controls ($n = 66$) living in the state of New York. Knoll (2008) was able to differentiate between typically developing children, children with HFA and LFA using the *BASC-2 Parent Rating Scales*.

When compared to typically developing children, children diagnosed with an ASD obtained the lowest scores on the adaptive composite, and all subscales comprising this composite (i.e., adaptability, functional communication, social skills, activities of daily living, and leadership; Knoll, 2008). For the externalizing composite, children diagnosed with an ASD received higher scores than typically developing children. Except for the conduct problems subscale, those diagnosed with

* Corresponding author at: Department of Psychology, Louisiana State University, Baton Rouge, LA 70803, United States. Tel.: +1 225 578 4104.
E-mail address: johnmatson@aol.com (J.L. Matson).

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an ASD scored significantly greater than the typically developing group on all other subscales comprising the externalizing composite (i.e., hyperactivity and aggression subscales). For the conduct problems subscale, there was no significant difference between typically developing children and children with HFA or LFA (Knoll, 2008). However, other research has demonstrated that children with ASD engage in greater amount of aggressive behaviors than typically developing children as well as comorbid psychopathology (Matson, Fodstad & Mahan, 2009; Matson, Mahan, Hess, Fodstad & Neal, in press; Matson & Nebel-Schwalm, 2007; Nicholas et al., 2008).

Although not all ASD groups had greater scores than the typically developing group on the internalizing composite, the HFA group had significantly greater scores than the LFA and typically developing groups (Knoll, 2008). Compared to typically developing controls, not all ASD groups scored significantly greater on the anxiety and depression subscales of the *BASC-2*. On both the anxiety and depression subscales, the HFA group had significantly greater scores than both the LFA and the typically developing groups. However, on the somatization subscale the typically developing group had similar scores to both the LFA and HFA groups with the HFA group scoring significantly higher than the LFA group. Furthermore, the ASD groups had significantly greater scores on the attention problems subscale, the withdrawal subscale, and the Behavioral Symptoms Index (BSI) than did the typically developing group (Knoll, 2008).

Although Knoll (2008) examined differences in scores between children with ASD and typically developing children, these results have not been replicated and as such, may not be generalizable to the entire ASD population. Therefore, the aim of the current study was to extend Knoll (2008) findings and to further understand how children and adolescents with ASD compare to typically developing children and adolescents on *BASC-2* scores. The current study compared children and adolescents with ASD to children and adolescents who are typically developing. Based on previous research discussed above, it was hypothesized that the ASD group would score significantly greater than typically developing group on the externalizing scale and all subscales comprising this scale, on the internalizing scale, on the depression subscale, on the anxiety subscale, on the atypicality subscale, on the withdrawal subscale, on the attention problems subscale, and on the BSI index. Conversely, it was hypothesized that the ASD group would score significantly lower than the typically developing group on the adaptability scale, and all subscales comprising the adaptability scale. In regards to the somatization subscale, it was hypothesized that the ASD group and typically developing group would have similar scores.

1. Methods

1.1. Participants

Primary caregivers served as informants and were recruited from schools, clinics, support groups, parent advocacy groups and community organizations from Louisiana, Georgia, Texas, Mississippi, California, Michigan, New York, and Connecticut. Participants consisted of 80 children and adolescents with ASD ($n = 38$), and typical development ($n = 42$). Since the number of participants in the comparison group ($n = 42$) is within 1.5 times the number of participants in the ASD group ($n = 38$), the number of comparison participants is appropriate (Leech, Barrett, & Morgan, 2008). Inclusion into the study included having no missing data on all subscales, scales, and composites of the *BASC-2*.

Inclusion into the ASD group occurred if the individual met cutoff for an ASD on the *DSM-IV/ICD-10 Checklist*. This was done to support an ASD diagnosis because some cites may have used different methods to diagnose ASD. A minimum of three endorsements on this checklist was required to meet *DSM-IV-TR* (American Psychiatric Association [APA], 2000) and *ICD-10* (World Health Organization, 1992) diagnostic criteria for ASD: two impairments in social interaction and one impairment in either repetitive, restricted or stereotyped patterns of behavior, or communication. This checklist has excellent reliabilities (i.e., internal consistency, interrater, and test retest), ranging from $r = .89$ to $r = .96$, (Matson, Gonzalez, Wilkins, & Rivet, 2008).

Table 1 highlights demographic information for the ASD and typically developing groups. The age range of children and adolescents with ASD ($n = 38$) was 6–16 years of age ($M = 9.53$, $SD = 2.90$), with the majority being male (78.9%) and Caucasian (71.1%). Eleven (28.9%) had one or more previous or current comorbid diagnoses as reported by their caregivers on a demographic form. These diagnoses included Attention Deficit Hyperactivity Disorder (ADHD; $n = 5$), a mood disorder ($n = 2$), an anxiety disorder ($n = 2$), Selective Mutism ($n = 1$), rule out Schizophrenia ($n = 1$), Stereotypic Movement Disorder ($n = 1$), and Borderline Intellectual Functioning ($n = 1$). Furthermore, at least 7 (18.4%) of children and adolescents had a comorbid Intellectual Disability (ID). There were 13 children and adolescents with missing data for whether they had a comorbid ID diagnosis. Nineteen of the children and adolescents with ASD (50.0%) were taking psychotropic medication at the time of data collection, with 12 taking two or more psychotropic medications. Among the children and adolescents in this

Table 1
Demographic information for the ASD and typically developing groups.

Group	*n*	Age range	Age		Gender (%)		Ethnicity (%)			
			M	*SD*	Male	Female	C	A	L	O
ASD Group	38	6–16	9.53	2.90	78.9	21.1	71.1	15.8	10.5	2.6
Typical Group	42	6–13	8.29	2.00	42.9	57.1	83.3	4.8	7.1	4.8

Note: n = number of participants per group; M = mean; SD = standard deviation; C = Caucasian; A = African American; L = Latino; O = other ethnicity.